Pre-Construction Documents for a Mobile Food Assembling & Distribution Station

Winnie He
California Polytechnic State University
San Luis Obispo, California

On Christmas Eve of 2018, Jessica He Liu, a chef in Los Angeles opened her home to friends and family to volunteer and help assemble food boxes and personal hygiene products and distributed these goods out to those in need. What started off as a goal to spread kindness during the holidays, became a yearly traditional non-profit volunteering event for those families involved. In March 2020, the deadly COVID-19 pandemic took the world by surprise, causing a copious amount of social distancing guild lines to be formed and enforced. Although there was still a slight hope that the pandemic would be over by the holiday season, it turned out that this yearly volunteering event will be cancelled due to the large numbers of volunteers crowding in a small space. In order to provide the volunteering experience of spreading joy without crowding the small spaces that were offered, the mobile food assembling & distribution station idea was created. The purpose of this project was to provide all the pre-construction documents needed in order to create a fully functional mobile station for food assembling and distribution purposes. Of course, this is taking into consideration of social distancing guild lines, and also that not every person out there has pre-existing construction knowledge. To accommodate the various user characteristics, pre-construction documents are created to fit users with different construction experience backgrounds, as well as lifestyle backgrounds. Understanding how these construction documents and legal documents are used and created is the goal of this document.

Key Words: Food Assembling, Distribution, Volunteering, Spread Kindness, COVID-19, Social Distancing, Non-Profit, Construction Documents, Legal Documents, Pre-Construction.

Introduction

In March of 2020, the deadly COVID-19 virus started to spread through all parts of the world, causing a pandemic that took the world by surprise. With copious amounts of social distancing guild lines being created and enforced, it came clear that the non-profit volunteering event during holiday season was going to get canceled. In order to spread kindness through this yearly event without crowding volunteers in a small space, the mobile food assembling & distribution station idea was formed. The purpose of the project was to provide all the pre-construction documents needed in order to create a fully functional mobile station for food assembling and distribution purposes. To accommodate various user characteristics, these pre-construction documents were created to fit users with different backgrounds, whether it was construction experience or lifestyle habits. In addition to creating a packet to fully construct this structure, the structure itself not only promotes social distancing, but also spreads the ability to distribute kindness in different parts of the world. This document will demonstrate the meaning and concept behind each pre-construction contribution, as well as allowing each unique user to fully understand and utilize it to create a fully functional project, despite having no construction experience or knowledge.

Background

On Christmas Eve of 2018, Jessica He Liu, a chef in Los Angeles opened her home to friends and family to volunteer and help assemble food boxes and personal hygiene products and distributed these goods out to those in need. With the help of social media and kind-hearted volunteers, this event became more well-known and eventually became a yearly traditional non-profit volunteering event. Those that wanted to participate but did not have the time to volunteer with physical labor donated instead, and all donations were used to purchase materials within the hygiene bags and food boxes. Those that did want to volunteer, would offer space in their own homes to allow volunteers to assemble goods. Every year, it is Chef Liu's goal to increase the count of goods that get distributed; however, this presented a challenge: the more goods and volunteers we needed, the less space we had to make it happen. As this event became more well-known, more volunteers and materials were involved, thus crowding the spaces provided to assemble these packages.

As the non-profit event became more well-known through social media, it was getting difficult to find volunteers to offer up spaces in their own homes to make the event happen. In addition to the existing difficulty of finding an available space, the COVID-19 pandemic also took the world by surprise, causing the rise of social distancing guidelines and enforcements. Winnie He, a current Cal Poly Construction Management student provided **Figure 1 to Figure 4** below to show how the event was operating before the pandemic took place. As you can see, there are more than 15 volunteers crowded in the corner of a living room provided by one of the volunteers, while the other materials and assembling stations are not even shown to prove the capacity issues. After the goods were assembled, each volunteer takes 5-10 sets of goods to distribute on their way to their next destination.

Figure 1: Volunteers

Figure 2: Hygiene Products

Figure 3: Volunteers with a receiver

Figure 4: Volunteers distributing the goods

In addition to the new social distancing guidelines that are being enforced, Winnie He developed this mobile food assembling & distribution station idea while taking mobility and efficiency into consideration. The idea is for every volunteer, or every group of volunteers to be able to have their own mobile food assembling & distribution station. The distribution & assembling station would be attachable via a trailer, which would attach to any normal car with a trailer hook. This saves the trouble of trying to find an area to assemble packages, and doubles as storage while volunteers are out and about to distribute the packages. Of course, this also helps enforce social distancing guidelines and guarantees the safety of our volunteers and receivers of the goods as well.

Project Purpose

The purpose of this document is to provide all the pre-construction services needed to create a mobile food distribution & assembling station. Pre-construction services may include but aren't limited to: cost analysis of the scope of work, plans and specifications, Schedules, and materials and equipment lists, and cut list, etc. The final product proposed is similar to a wooden shed, also incorporating some door and window openings to act as the distribution function. When the station is completed, it will be attachable to any car or truck via a trailer. The idea is for this food bank assembling and distribution station to be mobile. Keeping in mind that every user is unique with different construction and lift style backgrounds, the document accommodates all users by providing different versions or alternatives to provided solutions. Having the pre-construction documents out there available to the general public would be a great contribution to all volunteers interested in these types of projects. Not only will this mobile food distribution & assembling station be beneficial to volunteers, but it also gives participants a platform to help those in need.

Project Process

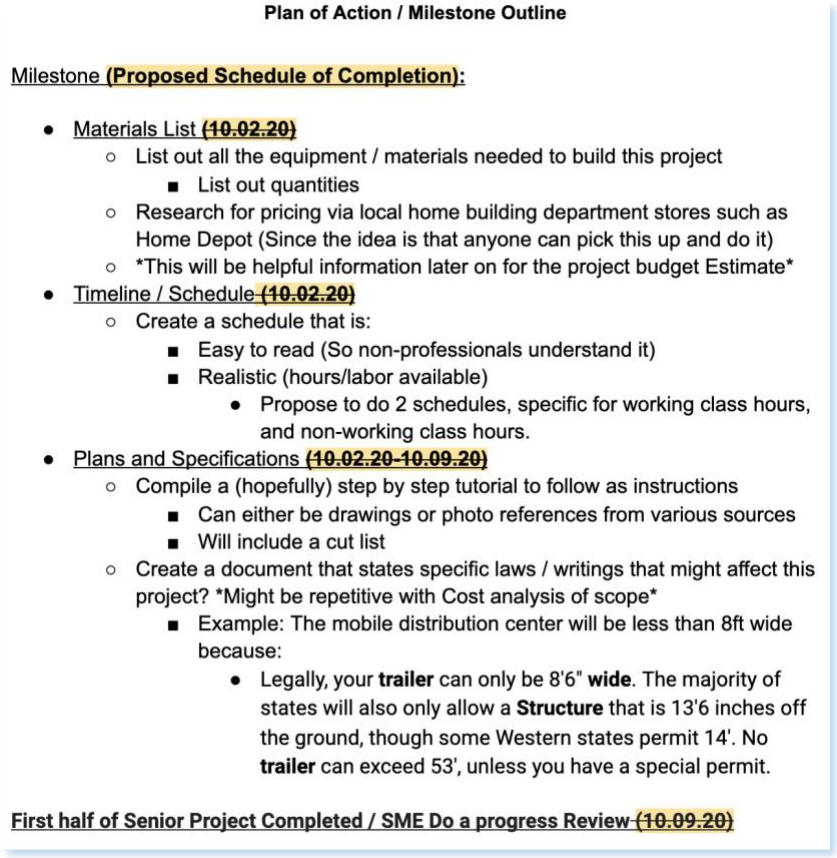
Pre-construction documents can vary depending on the project itself, some documents might be needed, but not every single document is applicable to the situation. With that said, the first part of the project process is to identify the specific documents needed for the situation. Things like plan of action, milestones or deadlines, documentation of discussions, etc., should all be taken into consideration before officially starting the construction documents. In a sense, there are things that should happen before the pre-construction. A plan of action and milestone outline was incorporated into the same document for this project, and meeting minutes were used to discuss the process of the general contractor, which is the student in this case.

Plan of Action & Milestone Outline

A Plan of Action is exactly as it sounds, it is plan created to show the steps and actions the general contractor will take to complete this project. Along with the plan of action, a Milestone Outline was also incorporated into the same documents, so important dates and deadlines are not forgotten. In a sense, this milestone plan describes the schedule and the expectations by specific dates, while the plan of action gives the scope to the general contractor. This part of the project process still describes what a general contractor needs to do, in order to provide a fully usable set of pre-construction documents. In this case, the student of this senior project, Winnie He, acts as the general contractor; this document was created to keep the general contractor on track, while serving as a guide to instructions as well. If

the owner or user of the project decides to hire an external general contractor, they can also provide these documents as a general guide for instructions.

A small portion of the final Plan of Action & Milestone Outline is shown in below:



Plan of Action / Milestone Outline

Milestone **(Proposed Schedule of Completion):**

- Materials List ~~**(10.02.20)**~~
  - List out all the equipment / materials needed to build this project
    - List out quantities
  - Research for pricing via local home building department stores such as Home Depot (Since the idea is that anyone can pick this up and do it)
  - *This will be helpful information later on for the project budget Estimate*
- Timeline / Schedule ~~**(10.02.20)**~~
  - Create a schedule that is:
    - Easy to read (So non-professionals understand it)
    - Realistic (hours/labor available)
      - Propose to do 2 schedules, specific for working class hours, and non-working class hours.
- Plans and Specifications ~~**(10.02.20-10.09.20)**~~
  - Compile a (hopefully) step by step tutorial to follow as instructions
    - Can either be drawings or photo references from various sources
    - Will include a cut list
  - Create a document that states specific laws / writings that might affect this project? *Might be repetitive with Cost analysis of scope*
    - Example: The mobile distribution center will be less than 8ft wide because:
      - Legally, your **trailer** can only be 8'6" **wide**. The majority of states will also only allow a **Structure** that is 13'6 inches off the ground, though some Western states permit 14'. No **trailer** can exceed 53', unless you have a special permit.

First half of Senior Project Completed / SME Do a progress Review ~~**(10.09.20)**~~

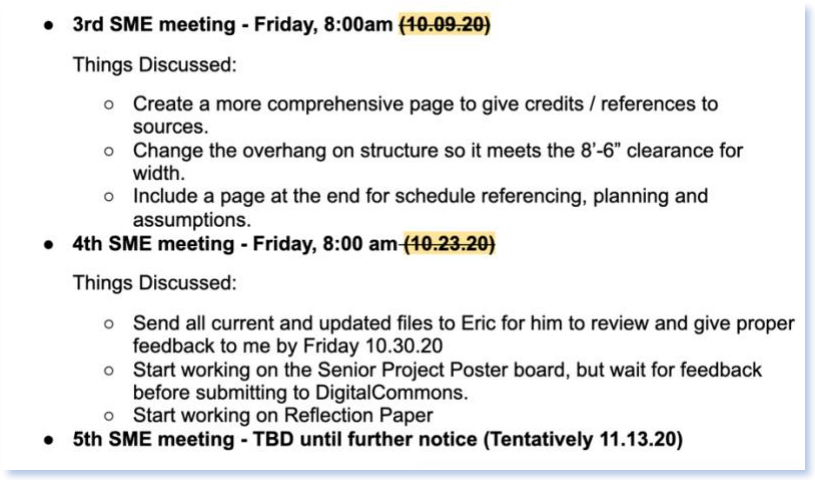
Figure 5: Plan of action & Milestone Outline

Meeting Minutes

In an industry involving various personnel, legal documents and safety concerns, meeting minutes is a great way to keep participants' roles and responsibilities documented. Meetings can be held for various reasons, with different participants from the owners', engineers', architects', and contractors' side; it is important that information is documented, so that those responsible are held accountable. In the case of this Senior Project, Winnie He, acting as the general contractor role had asked a university professor to act as a consultant. Meetings were always scheduled ahead of time, with a rough agenda of what will be discussed. Typically, the rough agenda is formulated while referencing the plan of action & milestone outline; this helps keep both parties accountable in schedule. During the meeting, both parties go over the agenda, the plan of action and the milestone outline, while mentioning the next potential meeting date and time. After the meeting, the general contractor creates a meeting minute documentation to summaries the discussed points, and also provides the next scheduled

meeting. The general contract is responsible for creating and providing the document to the consultant so that both parties have the proper documentation. In the case that the user of this project chooses to hire an external general contractor, they can set up the system in any method that they prefer. However, the key concept to keep in mind is to always have proper written documentation of the discussed items.

See below for the Meeting Minutes summary provided by the general contractor:



- **3rd SME meeting - Friday, 8:00am ~~(10.09.20)~~**

  Things Discussed:

  - Create a more comprehensive page to give credits / references to sources.
  - Change the overhang on structure so it meets the 8'-6" clearance for width.
  - Include a page at the end for schedule referencing, planning and assumptions.
- **4th SME meeting - Friday, 8:00 am ~~(10.23.20)~~**

  Things Discussed:

  - Send all current and updated files to Eric for him to review and give proper feedback to me by Friday 10.30.20
  - Start working on the Senior Project Poster board, but wait for feedback before submitting to DigitalCommons.
  - Start working on Reflection Paper
- **5th SME meeting - TBD until further notice (Tentatively 11.13.20)**

Figure 6: Meeting Minutes

Pre-Construction Documents

Construction Documents are collectively, the list of documents that describe every aspect of the project. Construction Documents fill in all the details from the final set of drawings that will specify every component of the project. Pre-construction documents are all the documents needed before starting an actual construction project. Pre-construction documents provide assumptions and discussion points, so owners have a chance to change the design or scope before finalizing the project details. Pre-construction services may include but aren't limited to: cost analysis of the scope of work, plans and specifications, Schedules, and materials and equipment lists, and cut list, etc.

Plans & Specifications

Plans and specifications are defined by the Building Act of 2004, which include the drawings, specifications and other documents from which the building is to be constructed, altered, demolished or removed, and the definition of building use. Almost the entire project can be based off the Plans and specifications, as it contains copious amounts of information that will aid progress. In the case of this senior project, the plans and specification document will contain floor plans, elevation views, and step by step instructions of how to build the structure. In addition to the design documents mentioned, the document will also include the legal verbiage, disclaimers, warnings and assumptions made to create the overall project.

See figures below to see overall table of contents and small portion of actual specifications written:

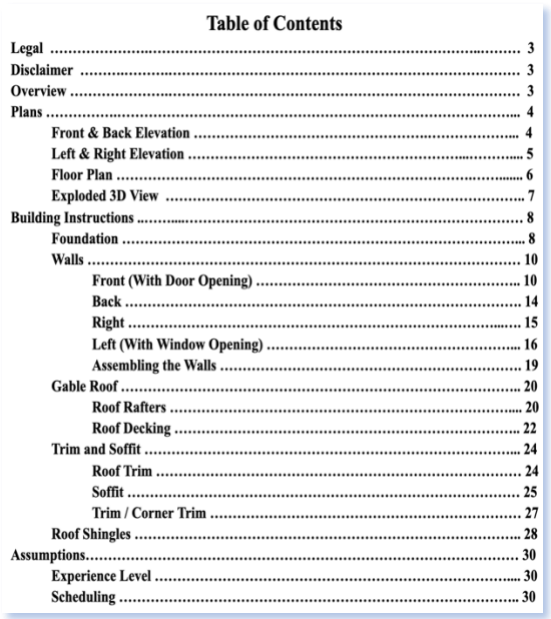
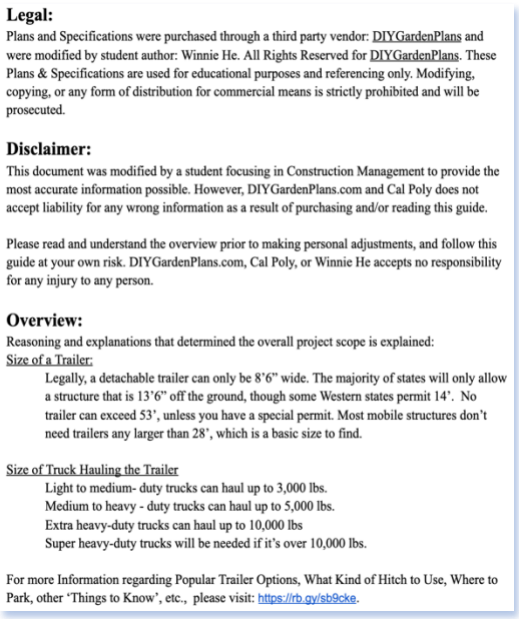


Table of Contents

Figure 7: Plans and Specifications: Table of Contents



Legal:

Plans and Specifications were purchased through a third party vendor: DIYGardenPlans and were modified by student author: Winnie He. All Rights Reserved for DIYGardenPlans. These Plans & Specifications are used for educational purposes and referencing only. Modifying, copying, or any form of distribution for commercial means is strictly prohibited and will be prosecuted.

Disclaimer:

This document was modified by a student focusing in Construction Management to provide the most accurate information possible. However, DIYGardenPlans.com and Cal Poly does not accept liability for any wrong information as a result of purchasing and/or reading this guide.

Please read and understand the overview prior to making personal adjustments, and follow this guide at your own risk. DIYGardenPlans.com, Cal Poly, or Winnie He accepts no responsibility for any injury to any person.

Overview:

Reasoning and explanations that determined the overall project scope is explained:

Size of a Trailer:

Legally, a detachable trailer can only be 8'6" wide. The majority of states will only allow a structure that is 13'6" off the ground, though some Western states permit 14'. No trailer can exceed 53', unless you have a special permit. Most mobile structures don't need trailers any larger than 28', which is a basic size to find.

Size of Truck Hauling the Trailer

Light to medium- duty trucks can haul up to 3,000 lbs.
Medium to heavy - duty trucks can haul up to 5,000 lbs.
Extra heavy-duty trucks can haul up to 10,000 lbs
Super heavy-duty trucks will be needed if it's over 10,000 lbs.

For more Information regarding Popular Trailer Options, What Kind of Hitch to Use, Where to Park, other 'Things to Know', etc., please visit: https://rb.gy/sb9cke.

Figure 8: Portion of actual written Specifications

As you can see from Figure 8, the legal verbiage shows that the plans and specifications were purchased through a third-party vendor: DIYGardenPlans; the reasoning for this is because the student author is acting as a general contractor that hired a separate design team or purchased a pre-existing design document from a third-party design team. A pre-existing general contractor hiring a design team is common in the construction industry, unless the construction firm itself has their own in-house designers.

Figures will be provided below to show the general floor plan and elevation views:

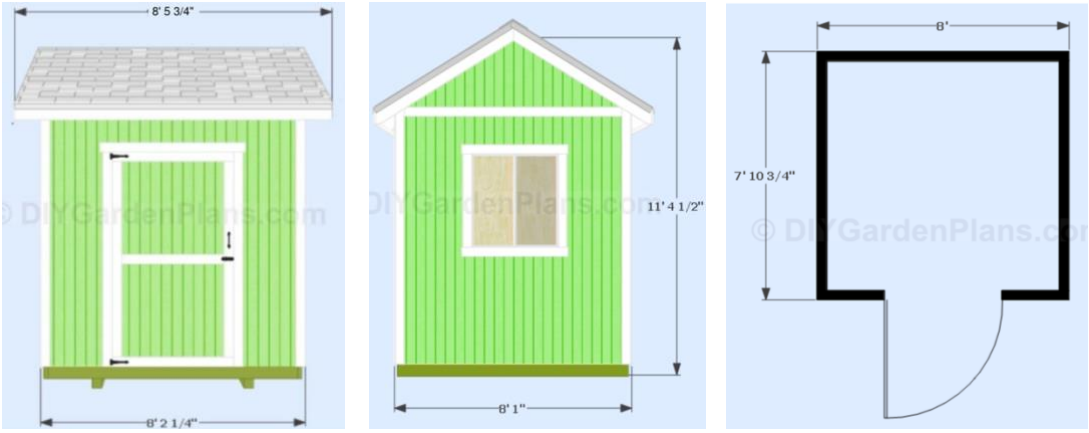


Figure 9: Front Elevation, Side Elevation & Floor Plan

As mentioned previously, step by step instructions of how to build this structure is also mentioned in the plans and specifications. Usually, instructions are not given in the plans and specifications unless it has a special requirement. However, the targeted audience exhibits a range of different construction experience, therefore, the general contractor thought to include the instructions to accommodate all interests. The instructions for the structure are broken down into different components, and then discussed in detail both in text form and visual form. Photo references with labels and dimensions are provided for each set of instructions to provide maximum clarity. Everything ranging from the structure component, the material dimensions, material labels, and detailed assembling references are spelled out in this part of the document.

See figures below for portions of the instruction's manual:

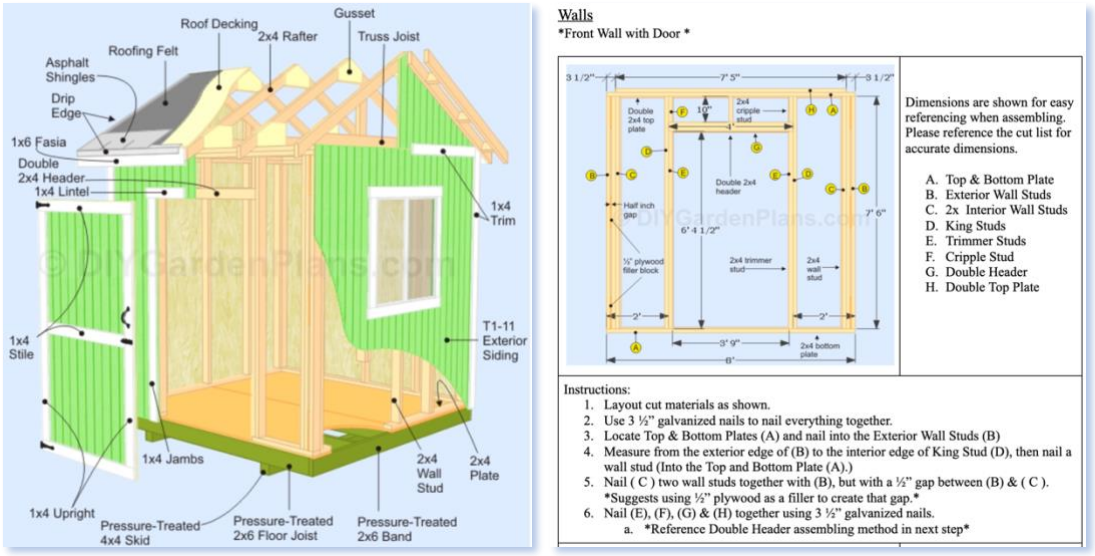


Figure 10: Labeled Components & Step-by-Step Instructions

Lastly, as mentioned earlier: assumptions made during the production of these pre-construction documents are also provided. Within this portion of the document, the discussion of experience level and scheduling is mentioned. The experience level of the user is unknown; therefore, these pre-construction documents are created with the assumptions that users of all experience levels are able to construct this product. The scheduling assumptions are also discussed in detail here and breaks it down to two different categories: the working-class schedule and the non-working-class schedule. Other assumptions are included as well, such as time allotted for lunch and breaks, different starting and ending times dependent on the season and such. The Assumptions page of the plans and specifications goes into details for items mentioned above.

Materials List

A material list is a predefined list of parts or components that may be referenced on an activity of a project, PM schedule, or standard work order to minimize data entry and ensure a consistent material plan for different jobs. Taken into consideration that there are various unique users that might access this project, the material list was created using local resources, assuming everyone has access to these

hardware franchises. Prices and material options are chosen to be the lowest selection possible, however, users can change the material preference based off of their own liking. The size of the materials needed is also provided for the specific project, but the users are free to change the size to their own customization.

See example of materials list in figure below:

Materials List				
Description	Quantity	Size	Price	Total Cost
Foundation				
Pressure-Treated 2x6	7	2" x 6" x 8'	$12.98	$90.86
Pressure-Treated 4x4	2	4" x 4" x 8'	$11.77	$23.54
3/4" Tongue and Groove Plywood	2	3/4" x 4" x 8'	$45.98	$91.96
			Total:	$206.36
Front / Back Wall				
2x4	25	2" x 4" x 8'	$5.85	$146.25
2x4	3	2" x 4" x 10'	$10.51	$31.53
2X4	2	2" x 4" x 4'	$3.98	$7.96
1/2" Plywood	1	1/2" x 4' x 4'	$24.11	$24.11
5/8" T1-11 Exterior Siding	3	5/8" x 4' x 8'	$38.74	$116.22
			Total:	$326.07
Door (6'6" high x 3'9" wide)				
1x4	6	1" x 4" x 8'	$4.33	$25.98
Door Hinges and Latch	1	Owner's Choice	$13.14	$13.14
			Total:	$39.12
Side Walls / Window				
2x4	19	2" x 4" x 8'	$5.85	$111.15
2x4	3	2" x 4" x 10'	$10.51	$31.53
5/8" T1-11 Exterior Siding	4	5/8" x 4' x 8'	$38.74	$154.96
Prefabricated Window (Optional)	1	Owner's Choice	$74.96	$74.96
			Total:	$372.60

Figure 11: Materials List

Equipment List

An equipment list is a predefined list of tools or equipment that should be used on a project activity to enhance the process. Taken into consideration that not every single person owns or has access to power tools and equipment, there is the option to purchase or rent the equipment or tools listed.
The equipment list was created using local resources, assuming everyone has access to these hardware franchises, the hardware franchise referenced also provides the equipment rental option. Prices and equipment options are chosen to be the lowest selection possible, however, users can change the equipment preference based off of their own liking. There is also the option of borrowing tools from family and friends, which will save cost in the long run; regardless, the list is provided for reference.

See example of equipment and tool list in figure below:

Equipment List		
Description:	Purchase Price	Rental Price
Staple Gun	$12.09	N/A
Caulk gun	$3.97	N/A
Circular saw	$49.97	$25.00 / day
Clamps	$37.42	N/A
Cordless drill	$35.61	$24.00 / day
Drill bit set	$24.97	N/A
Hammer	$4.97	N/A
Jigsaw	$49.97	$20.00 / day
Level	$2.97	N/A
Pocket hole jig	$19.97	N/A
Router	$69.00	N/A
Sawhorses	$41.97	N/A
Speed square	$8.87	N/A
Stepladder	$59.00	$27.00 / day
Tape measure	$4.97	N/A
Tin snips	$11.97	N/A

Figure 12: Equipment & Tools List

Cut List

A cut list is also called a cutting list and is closely related to a bill of materials. In fact, many wood workers treat them as one and the same, it's basically a list of all the t parts required to build a woodworking project that contains a number for each part along with its thickness, width and length. One can think of a cut list as a bill of materials for lumber and sheet stock without any of the cost information. Its purpose is to help users figure out how and where to cut each piece of wood. As mentioned earlier in the Materials list, users are free to change the dimensions and cut the material in whatever fashion they like, as the project can be customizable; regardless, the list is provided for referencing for this project specific.

Roof		
2X4 (Rafter)	18	4'-11 3/4" (with 30 degree angle cuts on both ends, same direction)
2x4 Rafter Crosspiece)	5	8' (60 degree angle cuts on both ends, opposite direction)
1/2" plywood (Gusset)	24	8"x14"
T1-11 Exterior Siding	~254 SF	For Truss Ends (Cut to Size)
1/2" plywood (Roof Decking)	2	4'x5'-3 7/16"
1/2" plywood (Roof Decking)	4	2'-3 3/8" x 5'-3 7/16"

Figure 13: Cutting List

Cost Analysis of Scope

The primary reason for conducting cost analysis is generally to determine the true costs of the programs under analysis. This Pre-construction report provides Cost-saving opportunities that could

be taken into consideration, and some changes in Scope & Design the will also reduce overall cost. There are cost-saving opportunities available, especially in materials cost, equipment cost, and potentially labor cost, which is broken down and explained in a detailed report. The cost analysis report can also provide ideas and options to change in scope & design to further decrease the cost. Whether or not the builder chooses to follow this assembled package exactly, there are many ways to go about this project. The assembled package's intention is to provide all the materials and options needed to make this project happen, but ultimately, the builder must make a choice. The suggestions to cost savings and scope changes are there for the builders' review.

Look at Tables below for examples of the cost-analysis report:

Buying / Hiring	
Pros	**Cons**
Fastest option for a ready to move-in structure	Expensive
Expertise Knowledge & Suggestions	Design vs Functionality can be varied
	Research & Reputation

Table 1: Pros and Cons of Buying & Hiring

Self-Performed Work	
Pros	**Cons**
Customizable	Motivation
Realistic Budget on Tools & Materials	Inefficient Purchases
Flexible Working Schedule	Long Durations

Table 2: Pros and Cons of Self-Performed Work

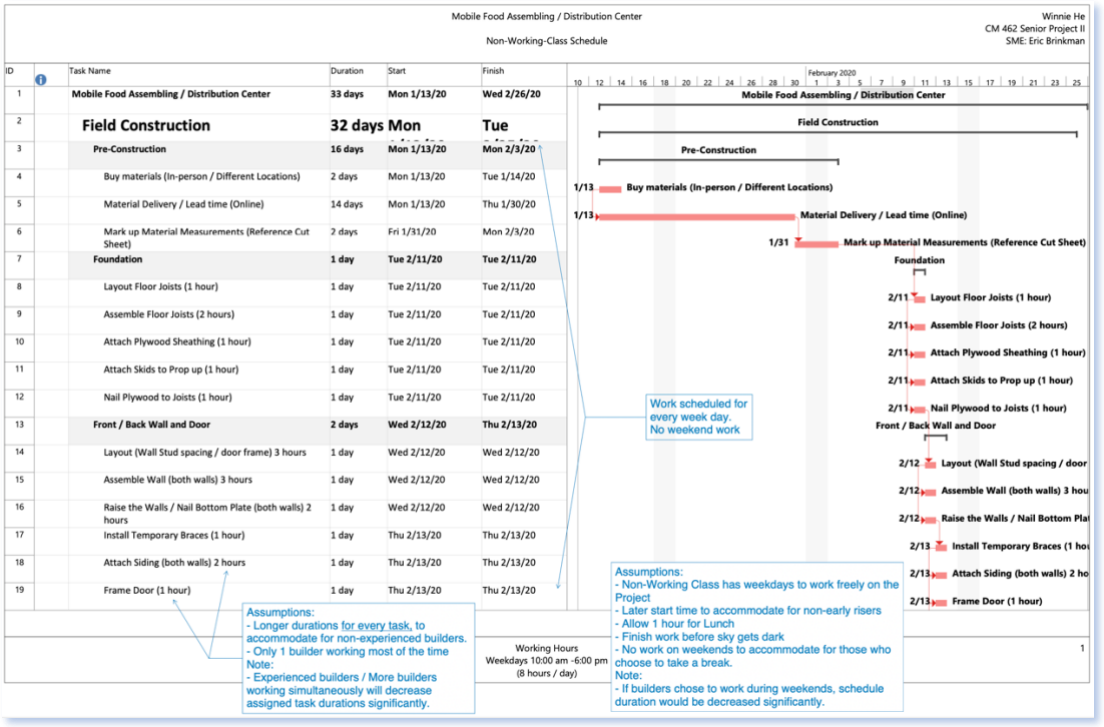
Construction Schedules

In construction management, a construction project's schedule outlines each step that should be completed by a specific date before the next step can be taken. A successful schedule ensures that project steps are completed in a timely manner and in a way that minimizes delay. In a more casual sense, a construction schedule is similar to that of a game plan that has an attached timeline. This document is very useful in staying on track with a project and provides an expected time frame needed to complete a project.

Two Schedules: Working-Class & Non-Working-Class

The Working-Class schedule assumes that the builder will be working a regular 9am-5pm job on weekdays, allowing them to only have weekends to work on the project. The Non-Working-Class schedule is the opposite and assumes that instead of working at their occupation for 40-hour weeks, the builder will be spending 40 hours a week working on this project instead. Extra durations were taken into consideration when formulating the schedules, and more than enough time is allotted for all the tasks mentioned within the schedule. A builder with zero construction knowledge or experience

will be able to pick up the schedule and understand the durations and sequencing needed to create the project. With that said, builders at a more advanced experience level would be able to finish the project at a faster pace, and this schedule would be cut down in durations.



ID	Task Name	Duration	Start	Finish
1	**Mobile Food Assembling / Distribution Center**	**33 days**	**Mon 1/13/20**	**Wed 2/26/20**
2	**Field Construction**	**32 days**	**Mon**	**Tue**
3	**Pre-Construction**	**16 days**	**Mon 1/13/20**	**Mon 2/3/20**
4	Buy materials (In-person / Different Locations)	2 days	Mon 1/13/20	Tue 1/14/20
5	Material Delivery / Lead time (Online)	14 days	Mon 1/13/20	Thu 1/30/20
6	Mark up Material Measurements (Reference Cut Sheet)	2 days	Fri 1/31/20	Mon 2/3/20
7	**Foundation**	**1 day**	**Tue 2/11/20**	**Tue 2/11/20**
8	Layout Floor Joists (1 hour)	1 day	Tue 2/11/20	Tue 2/11/20
9	Assemble Floor Joists (2 hours)	1 day	Tue 2/11/20	Tue 2/11/20
10	Attach Plywood Sheathing (1 hour)	1 day	Tue 2/11/20	Tue 2/11/20
11	Attach Skids to Prop up (1 hour)	1 day	Tue 2/11/20	Tue 2/11/20
12	Nail Plywood to Joists (1 hour)	1 day	Tue 2/11/20	Tue 2/11/20
13	**Front / Back Wall and Door**	**2 days**	**Wed 2/12/20**	**Thu 2/13/20**
14	Layout (Wall Stud spacing / door frame) 3 hours	1 day	Wed 2/12/20	Wed 2/12/20
15	Assemble Wall (both walls) 3 hours	1 day	Wed 2/12/20	Wed 2/12/20
16	Raise the Walls / Nail Bottom Plate (both walls) 2 hours	1 day	Wed 2/12/20	Wed 2/12/20
17	Install Temporary Braces (1 hour)	1 day	Thu 2/13/20	Thu 2/13/20
18	Attach Siding (both walls) 2 hours	1 day	Thu 2/13/20	Thu 2/13/20
19	Frame Door (1 hour)	1 day	Thu 2/13/20	Thu 2/13/20

Figure 14: Non-Working-Class Schedule

Other basic assumptions that are included in the schedule are later start times, time allotted for lunch and breaks, and ending times before the sky goes dark. Later start times accommodate for those builders that tend to sleep in. Lunch and break times are totaled to 1 hour and is placed somewhere in between the 8 hour duration. Builders should stop working on the project before the sun goes down, but due to the fact that it is unpredictable as to when the builder decides to start this project, a set time of 6:00pm is used.

Conclusion

Pre-construction documents can vary depending on the project itself, some documents might be needed, but not every single document is applicable to the situation. The purpose of this document is to provide all the pre-construction services needed to create a mobile food distribution & assembling station. The student author, Winnie He, developed this mobile food assembling & distribution station idea while taking mobility and efficiency into consideration. The idea is for every volunteer, or every group of volunteers to be able to have their own mobile food assembling & distribution station.

The first part of the project process is to identify the specific documents needed for the situation. A plan of action and milestone deadline and meeting minutes were created to keep the student author on

track, but also provided general good bookkeeping strategies to the users. The pre-construction services included were: Materials, Equipment, and Cut lists, a cost analysis of the scope of work, plans and specifications, and two different schedules to accommodate the unique user characteristics. The actual final product proposed from this project is similar to a wooden shed, also incorporating some door and window openings to act as the distribution function.

In conclusion, though the pandemic took away the opportunities for students to create physical project based senior projects, doing a virtual senior project was also a rewarding experience. This senior project demonstrates the knowledge and experience that students gain throughout the years at Cal poly. Being able to create a project that can contribute to such a kind cause is not only rewarding, but also a defining life experience.

References & Appendix

Colem, Joseph D. (2004*). Construction Documents and Contracting. Pearson, Prentice Hall.*

Starzyk, Gregory F. (2015). *Construction Law: Contracts, Risks and Regulations. Civilisation Chronicles.*